AGRICULTURAL NEWS LETTER

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This publication contains information regarding new developments of interest to agriculture based on laboratory and field investigations by the du Pont Company. It also contains published reports of investigators at agricultural experiment stations and other institutions as related to the Company's products and other subjects of agricultural interest.

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ABOUT 32 POUNDS OF NITROGEN GIVE MAXIMUM ECONOMIC ACRE YIELDS OF CORN IN SOUTH WHEN ONLY 4,500 PLANTS ARE GROWN

Most Southern corn growers leave about 4,000 to 4,500 plants per acre in their fields, or about one plant every 36 inches in the row.

This many plants can ordinarily utilize only 32 to 40 pounds of nitrogen per acre; and in experimental work, corn yields have been raised from the Mississippi state average of 15 bushels to 25 or 30 bushels per acre by such treatment.

Larger applications of nitrogen raised yields somewhat more than this, but the increase per pound of nitrogen was often too small to pay for the fertilizer above the 32-to 40-pound rate*.

"Corn is very responsive to fertilizer, particularly to nitrogen," says "Mississippi Farm Research." "For each bushel of corn produced, about one and one-fourth pounds of nitrogen must be supplied by the soil or in fertilizer.

"For some time it has seemed to those interested in soils and fertilizers that it should be possible to raise corn yields higher and higher; but there seemed to be a practical ceiling on these efforts.

"It now develops that by increasing the number of plants per acre at the same time as the nitrogen applications are raised, yields can be increased very much above what was formerly thought to be the ceiling."

*Editor's Note: A 100-pound bag of Du Pont's "Uramon" fertilizer compound supplies 42 pounds of nitrogen in the form of urea.

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HEAVIER NITROGEN APPLICATIONS PLUS THICKER SPACING DOUBLES AND TREBLES NORMAL ACRE YIELDS OF CORN IN MISSISSIPPI TESTS

By greatly increasing both the amount of nitrogen applied and the number of corn plants customarily grown per acre, "the average yield in Mississippi might readily be trebled or raised even higher."

These are the implications of research conducted by the Mississippi Agricultural Experiment Station, according to that Station's monthly publication, "Mississippi Farm Research," Vol. 10, No. 2. Of course, such increased yields presuppose other improved practices, including use of good soil and of best-adapted planting seed.

The combination of high nitrogen rates and heavy stands was first studied in Mississippi by Drs. Russell Coleman and Robert C. Eckhardt in 1945. They applied no nitrogen and nitrogen at the rate of 20, 40, 60, and 80 pounds per acre in combination with stands of 4,000, 8,000, and 12,000 plants per acre. Phosphate and potash were compared at levels of up to 40 pounds of each per acre. Seven experiments distributed throughout the hill section of the state were conducted.

Highest Yields Obtained With Heaviest Nitrogen Application and Stands of 8,000 or 12,000 Plants per Acre

"The highest yields were obtained in all cases with the heaviest application of nitrogen and stands of 8,000 or 12,000 plants per acre," the report says. "In some experiments there was evidence that even more nitrogen could have been used profitably. Yields were raised above 70 bushels per acre in two experiments and to 60 bushels or more in three others. There were only small responses to phosphate and potash."

The experiments were continued in 1946 under direction of Howard V. Jordan of the U.S.D.A. Division of Soils, Fertilizers, and Irrigation, and the Mississippi Experiment Station. Nitrogen applications were raised to 120 pounds per acre as a maximum, of which 30 pounds were applied at planting time and the remainder as side-dressing when the corn was knee high. Phosphate and potash rates were raised to 80 pounds of each, and stands were adjusted at 4,000, 8,000, and 12,000 plants per acre, as in 1945.

Yield Increased One Bushel For Every Two Pounds of Nitrogen Applied

At all points except one, where conditions were unfavorable, there was an increase in yield of about one bushel of corn for each two pounds of nitrogen applied as fertilizer until the highest yield was reached.

Continued on next page

At present cost of nitrogen, "an exchange of two pounds of nitrogen fertilizer for one bushel of corn presents an attractive prospect," the report says.

Size of Ears Not Reduced By Thick Stands Plus Nitrogen

"In these experiments, it was found that increasing the number of plants without adding sufficient nitrogen reduced the size of ears, but when nitrogen and stand rates were raised at the same time the ears were at least as large as those produced by the usual farm practices."

Thicker Stands Recommended Only When High Nitrogen Rates Are Used

The experiments clearly demonstrated that, except on the most fertile soils, more plants than usual should not be left unless high rates of nitrogen are used, the report continues, adding:

"Even with 30 or 40 pounds of nitrogen per acre, when the stand was increased above that usually left in the field, the yield usually went down. It was only with the 60, 90, and 120-pound rates of nitrogen that the heavier stands were profitable. The work to date indicates that 90 pounds of nitrogen and 10,000 plants per acre are a satisfactory combination. About one-third of this nitrogen should be applied at planting time, and the remainder as side-dressing when the corn is knee high."

The statement points out that it is important to control weeds in the corn field early in the season, and to avoid deep or late cultivation.

"As an added advantage, it was found that there was less grass and weed growth in the well-fertilized heavy stands than in the usual stands, and less cultivation was needed."

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RESEARCH INDICATES IOWA FARMERS NOT GROWING ENOUGH CORN PER ACRE TO OBTAIN HIGHEST YIELDS FROM THEIR FERTILIZER

Many Iowa and other Mid-west farmers are not growing enough corn per acre to get the best yields from their fertilizer, say Dr. L. B. Nelson and Lloyd Dumenil, agronomists at the Iowa Agricultural Experiment Station.

Reporting results of two years' tests, they say that "if both moisture and fertility are high, it appears that greatest yields will come from stands with four or five stalks per hill, or 15,000 to 19,000 stalks per acre. Adding an extra stalk per 40 x 40-inch hill on well-fertilized soil boosted yields 8 to 16 bushels per acre, where heavier than normal applications of fertilizer were made. And, on some of Iowa's fertile soils, better yields can be obtained with thicker stands even when fertilizer is not used.

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THICKER STANDS OF CORN SHADE SOIL AND REDUCE GRASS

Georgia corn tests show that seed should be planted sufficiently thick so that plants can be thinned to a stand of 18 to 21 inches in rows 3½ to 4 feet apart. Such stands can profitably use considerably more fertilizer than is commonly applied. In addition, the Georgia Experiment Station found that "thicker stands will shade the soil and reduce grass, as well as produce higher yields."

EXPERIMENTS SHOW INADEQUATE FERTILIZATION AND NOT ENOUGH PLANTS PER ACRE ARE CAUSES OF LOW CORN YIELDS IN GEORGIA

The Agricultural Experiment Station at Experiment, Ga., recently issued a unique news release, with two narrow columns, side by side, on one mimeographed page, under the general heading "Corn Fertilization for Georgia." One of the columns gives results of experiments conducted by L. C. Olson and Orien L. Brooks in the Piedmont-Coastal Plain section and the other in the Mountain area.

Both items have identical first paragraphs stressing the fact that "inadequate fertilization and not enough plants to the acre are the principal causes of the low 10-bushels-per-acre corn yield on 4 million acres devoted each year to that crop in Georgia." The remainder of each item gives results of the research for the particular area involved. In both instances about 7,200 plants per acre were grown by spacing the plants 21 inches apart in 3½-foot rows.

In the Piedmont-Coastal Plain section, that number of plants per acre gave profitable returns from applications of as much as 400 pounds of a 4-8-8 fertilizer at planting, and a side-dressing that added about 24 pounds of nitrogen when the corn was six weeks old, making a total of about 40 pounds of nitrogen and 32 pounds each of phosphate and potash. Increasing the stand from 4,100 to 7,600 plants increased the yield 20 bushels per acre.

In the Mountain area, 12 bushels per acre increase over the check plot were obtained where 30 pounds of nitrogen, 60 pounds of phosphate, and 60 pounds of potash were used with stands of 7,200 plants. In the item on the results of the experiments in this area, Olson and Brooks report: "It is interesting to note that as the rate of application of fertilizer was increased, the number of ears per acre, as well as the size of ears, increased."

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NORTH CAROLINA'S FIVE-POINT PROGRAM TO DOUBLE YIELDS OF CORN INCLUDES FERTILIZATION AND THICKER SPACING

In some preliminary fertilizer tests in North Carolina in 1944, 9,000 to 10,000 corn plants per acre were used with rather sensational results. Farmers in that state usually grow only half that number in their actual farming practices.

The results of these experiments showed that the thicker spacing is required for best yields under good fertility and moisture conditions. The larger stands did not decrease grain yields even under drier or less fertile soil conditions, according to Dr. Ralph W. Cummings, head of the Department of Agronomy at North Carolina State College.

Experiments Substantiate Several Important Facts

This work, conducted under the supervision of Dr. B. A. Krantz, substantiated the facts that (1) nitrogen is the first and most consistent factor limiting corn yields, (2) approximately two pounds of nitrogen are required for each bushel of corn produced, (3) plants must be spaced closer than commonly practiced if good yields are to be produced, (4) closer spacing and good fertilization make possible satisfactory weed control with simpler and shallow cultivation which does not damage root system too severely, and (5) yields greatly above the state average can be produced even under the drier conditions encountered, and yields several times the state average can be produced where rainfall distribution is good.

Nitrogen Fertilizer Increases Yields Substantially

Discussing experiments conducted in 1944, 1945, and 1946, Dr. Cummings' report says:

"With very few exceptions, yields were increased substantially by applications of nitrogen. In some cases, the yield increase from nitrogen applications was practically linear up to considerably above 100 pounds of nitrogen per acre. This means simply that each additional pound of nitrogen applied, up to 100 pounds per acre, gave about the same increase in corn yield."

Three Years' Results Compared

Comparing results in 1946 with those in 1944 and 1945, the report says: "The almost linear response up to 120 pounds of nitrogen in 1946 reflects the fact that growing conditions were favorable in most of the locations where experiments were located, while decreasing returns at the higher levels in 1944 and 1945 reflect the fact that there were more locations in those years where conditions other than nitrogen supply limited the maximum yields."

Continued on next page

Yields Average 66 Bushels Per Acre In Statewide Demonstrations

The North Carolina Extension Service in 1945 launched a five-point program aimed at doubling the state average yield within ten years. This plan called for use of adapted hybrid or proved local variety, adaptation of the fertilizer at planting to soil conditions, growing enough plants to produce the desired yields, avoiding late or deep cultivation but controlling weeds early, and varying side-dressing with soil fertility and desired yield increase.

Demonstrations In Every County In State

County agents and others put on demonstrations in every county in the state in 1945. The 273 reported showed an average yield of 66 bushels per acre. An average of 7,888 plants per acre was grown in these tests, and the average fertilizer cost was around 25 cents per bushel both for the total yield and for the increases in yield above that obtained with the farmers' usual practices. In 1946, with only part of the results in at the time of the report, 45 counties had reported one or more yields above 100 bushels per acre.

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PRELIMINARY TESTS INDICATE ONION JUICE STRENGTHENS 2,4-D WEED KILLER

Preliminary experiments at the Michigan Agricultural Experiment Station indicate that a 2,4-D solution receiving an addition of specially treated onion juice not only does a more thorough job of weed control but effectively covers a greater area.

"The strength of 2,4-D weed killer may be stepped up from 10 to 20 times by onion juice," according to Dr. E. H. Lucas and Dr. C. L. Hamner, Michigan research horticulturists. "Approximately 20 different extracts from fruits and juices were tried, some of which had the opposite of the desired effect. With the cooperation of the Eastern Regional U. S. Research Laboratory at Philadelphia, experiments are being conducted to isolate the part of the onion juice that has the most powerful effect.

"While not recommended until further experiments are conducted, indications are that one pound of onions, properly mashed, and mixed with 2½ gallons of the water 2,4-D solution, is the most effective mixture. In these experiments, the sodium salt of 2,4-D was used."

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VETERINARIAN RECOMMENDS DOSING WITH MIXTURE OF FORMALDEHYDE AND WATER OR MILK AS ONE EMERGENCY TREATMENT FOR CATTLE BLOAT

Treatments of bloat in cattle recommended by Dr. J. W. Scales, veterinarian, Mississippi Agricultural Experiment Station, for emergency use while awaiting the arrival of a veterinarian include a mixture of one tablespoonful of formalin (formaldehyde) in a pint of cold water or milk.

Dr. Scales says two other simple emergency treatments are dosing with a half a cup of coal oil (kerosene) in enough cream or milk to make a pint, and four tablespoonfuls of turpentine in a pint of water or oil. Raw lineseed oil can be used, He adds:

"The old practice of placing a stick crosswise in the animal's mouth, maintaining it there by a halterlike arrangement, favors tongue movements and the eructation of gas.

"If absolutely necessary, and the victim is gasping for its life, 'tap' the left side with a trocar or a small knife. This will allow the gas to escape, and is often a life-saver."

BLOAT CAUSED WHEN CATTLE EAT TOO MUCH LEGUMES TOO FAST. WET OR WILTED GRASS, CABBAGE LEAVES, BEET TOPS ALSO DANGEROUS

Bloat in cattle increases when the clovers or other legumes are pastured. In Mississippi and other southern states, clovers grow throughout most of the winter.

"Often they are the only green feed available in the pastures, and sometimes they are the only food available," says Dr. J. W. Scales, veterinarian at the Mississippi Agricultural Experiment Station.

"Cattle eating too much in too short a time may become bloated," he says. "Legume pastures covered with dew or frost are more apt to cause bloat because they permit the cow to eat and swallow the forage faster.

"The foods usually responsible for acute bloat are the clovers, alfalfa, peas, beans, and other legumes, as well as grass, cabbage leaves, beet tops, and others. The foods named are more than likely to be dangerous when they contain a relatively large amount of water; or if they are wet as the result of frost, dew, or rain; or if they are wilted during the early stages of the curing process; or if they are undergoing heating."

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Prevention of Bloat

The overnight feeding of 15 to 20 pounds coarse hay, such as Sudan or Johnson grass, per animal tends to prevent bloat, Dr. Scales says.

"When cows are fed only two hours before pasturing they do not eat enough of the roughage to be protected," he adds. "A roughage of poor palatability will not be effective because of the small amount taken. Clovers should be pastured only when free of dew, rain, or frosting. Feeding of minerals will not prevent bloat."

Emergency Treatment of Bloat While Awaiting Veterinarian

"Death from acute bloat is so quickly imminent that immediate steps must be taken if the amimal's life is to be saved," he continues. "Call the veterinarian, and if his arrival is likely to be delayed beyond a few minutes, each affected animal should receive some medicinal agent at once to stop the fermentation."

Dr. Scales lists the emergency measures outlined in the foregoing box.

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NEW INSECTICIDE CONTROLS LICE ON CATTLE, HOGS, AND IN CHICKEN HOUSES

Lice on cattle, hogs, and in chicken houses can be killed and normal hatching of lice eggs can be prevented by proper treatment with the new insecticidal compound called hexachlorocyclohexane or benzene hexachloride (BHC), according to Ray L. Cuff, regional manager, National Live Stock Loss Prevention Board, Kansas City.

In his experiments, Mr. Cuff found that four pounds of 50 per cent hexachlorocyclohexane to 100 gallons of water made the proper concentration for most effective control.

"Very lousy cattle and calves were cleaned with only one very thorough application," he reports.

This new chemical compound, supplied in Du Pont's "Lexone"-50 insecticide, was found to be an excellent treatment for hogs with mange and lice.

"Tests with the material in painting roosts and spraying chicken houses show it to be superior for chicken louse and mite control," Mr. Cuff adds.

Gives Relief to Horses and Mules from Stable Flies and Botflies

He says a mixture made by adding one-half pound of 50 per cent wettable BHC to one gallon of water also gives relief from stable flies and botflies when it is sponged once or twice a week on the leg and throat areas of horses and mules.

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CHEMICAL FERTILIZERS HELP, RATHER THAN HARM, EARTHWORMS

Those who say chemical fertilizers kill the "fishin' worms" in the soil are all wrong, says Dr. Firman E. Bear, chairman of the Soils Department of the New Jersey Agricultural Experiment Station.

Instead of harming these beneficial worms, which do a sort of cultivation job by helping keep the earth friable or crumbly and full of air, chemicals added to feed plants actually mean more food for the worms, too.

"In general, the heavier the application of fertilizer, within limits, the greater the growth of crops and the larger the amount of crop residues left in the soil," Dr. Bear told a group of fertilizer manufacturers recently. "These crop residues provide the food for the earthworms. Earthworms are no more sensitive to fertilizer than are the root hairs of plants. If temporarily disturbed by an overdose, a worm can move but a root hair cannot."

Speaking at the annual convention of the American Plant Food Council at Hot Springs, Va., Dr. Bear reported results of an experiment at the New Jersey Station at New Brunswick. He said a plot of limed land was planted to lespedeza sericea.

1,200,000 Worms Per Acre In Top-Soil After 6 Years

"This land received 1,000 pounds of 0-12-12 (containing phosphoric acid and potash) per acre at seeding time, and 500 pounds per acre every year for the next five years," he said. "On November 6, 1946, the number of earthworms in the top six inches of soil was 1,200,000 per acre, with an additional 90,000 in the second six inches, and 30,000 more in the third six inches."

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LIFE EXPECTANCY OF HUMANS INCREASED GREATLY DURING PAST CENTURY

Life expectancy of human beings today is nearly two-thirds more than it was a hundred years ago.

Answering those who claim chemicals added to the soil as fertilizers injure health, Dr. Firman E. Bear, New Jersey Agricultural Experiment Station soil scientist, told the annual convention of the American Plant Food Council at Hot Springs, Va., that in 1850, before farmers began using commercial plant food, the average life expectancy at birth in the United States was 40 years.

"By 1900, when fertilizers were being used at the rate of over 2,000,000 tons annually, our life expectancy had increased to 49½ years," he said. "By 1940, with fertilizer consumption over 8,000,000 tons, life expectancy rose to 63 years; and in 1944, when fertilizer tonnage reached 12,000,000 tons, life expectancy increased to 66½ years."

Dr. Bear said that while one would hesitate to claim that fertilizers are responsible for the 26 years longer lease on life we now possess than did our grandfathers a century ago, it would certainly be difficult to make a case against fertilizers on that score.

Explaining why we have so much trouble with degenerative diseases of the heart, brain, liver, kidney, and other vital organs, despite the increase in life expectancy, Dr. Bear said "we are having more difficulty with the diseases of old age because we have more old people."

He added that in 1900 a total of 4.1 per cent of the people of the United States was 65 years of age or older, 6.8 per cent in 1940, and "it is estimated that 14.4 per cent of our population, or nearly 24 million people, will be 65 or older by 1980."

The New Jersey scientist made it clear that fertilizer adds nutritive value to crops.

"Our primary objective is to produce high yields of high quality crops," he said. "Yields can be measured by the use of scales. Quality is often measured by the senses. Thus animals decide by taste whether or not the crop has quality.

"Livestock will often avoid manured grass to the point almost of starvation. But they will pick out a chemically fertilized grass plot, no matter how small, and chew it down into the soil. They need something the fertilizer supplies.

"It has been repeatedly shown that emaciated, listless livestock can be made to flourish when their impoverished pastures are treated with chemical fertilizers, especially those that supply phosphate."

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SEED TREATMENT GIVES BETTER STANDS AND BIGGER YIELDS OF RICE

Growers can get better stands and substantially larger yields by treating their rice seed with chemical disinfectants to control seedling blight and other diseases.

In experiments at the Rice Branch Agricultural Experiment Station at Stuttgart, Ark., Du Pont's "Arasan" seed disinfectant, applied at the rate of 1½ ounces per bushel of seed, was one of two fungicides that were "particularly effective" both years of the test. Three other materials showed promise on the basis of one years' work.

Arkansas Reports Results of Recent Experiments

Report Series No. 5, "Rice Seed Treatment," recently published by the University of Arkansas at Fayetteville, says that in 1945, Dr. E. M. Cralley, plant pathologist, treated three varieties with five different compounds; in 1946 he treated four varieties with four compounds.

"In 1945, the stands were materially improved and the average yields were increased about four bushels per acre," the report says. "Results of the test in 1946 were in agreement with those from the 1945 test, and show that stands were improved and yields greatly increased."

The average yield per acre for the two years was 41 bushels for untreated seed and 46 bushels for seed treated with "Arasan." The report adds: "No ill effects on seed germination have been observed when the seeds have been treated in the fall for spring planting. However, treated seed should not be used for feed or milling."

Treatment Effective On Threshed Seed -- Not On Combined Seed

The stand and yield of threshed and combined lots of seed of Zenith, Prelude, Arkansas, Fortuna, and Nira rice, taken from the same field and treated with "Arasan," were also studied in 1946. The threshed seed gave improved stands and substantial increases in yield, but "significant increases in yield were not obtained with any of the lots of combined seed," Dr. Cralley's report says.

Recommends Treating Seed Every Year As Crop Insurance

The report points out that the severity of seedling blight and the amount of disease carried in the seed vary from year to year, depending on weather conditions. Likewise, the amount of disease carried in seed rice may vary greatly from year to year.

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"Therefore, rice seed treatment may be of great value in some cases and of little benefit in others," the report explains. "However, since it is impossible to predict whether or not seedling blight or other seed-borne disease will cause serious losses in any particular year, and since the cost of the treatment is slight, it is recommended that seed rice be treated every year as a type of crop insurance."

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ARKANSAS EXPERIMENTS SHOW SEED TREATMENT INCREASES CORN YIELDS

From 5 to 10 per cent higher yields of corn will be obtained if the seed is treated before planting, according to a bulletin, No. 466, "Corn Seed Treatment," recently issued by the Arkansas Agricultural Experiment Station at Fayetteville.

Corn seed treatment tests were carried on from 1943 to 1946 by Dr. E. M. Cralley, plant pathologist for the station. The bulletin says he planted corn seed that had been treated with different chemicals at the Main Station, the Rice Branch Station at Stuttgart, and the Cotton Branch Substation at Clarkdale.

"Arasan"-Treated Seed Give Better Stands and Yields

The bulletin reports that seed treated with "Arasan" seed disinfectant "gave from 5 to 10 per cent better stands and yields than untreated corn."

"Since the severity of the seedling diseases of corn varies from year to year depending on weather and other factors, treating the seed may be of great value in some cases and not in others," the bulletin points out. "However, since treatment costs little, it is recommended that it be used every year as a form of insurance."

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APPLE TREES SPRAYED WITH FLOTATION SULFUR, IN VIRGINIA TESTS, OUTYIELD TREES SPRAYED WITH LIME-SULFUR TO CONTROL SCAB

To determine the ultimate value of certain fungicides, research workers not only undertake to establish the relative effectiveness of the chemical formulations in the control of a specific disease or diseases, but also their comparative effects on such important factors as crop yield and plant growth.

With this in mind, Dr. A. B. Groves, Virginia Experiment Station, undertook to find out the comparative effects on yield and tree growth of liquid lime-sulfur and flotation sulfur, both widely and successfully used as fungicidal sprays to control apple scab. He launched his tests in 1941 on a block of eight-year-old Starking Delicious trees in the R. S. Smith orchard near Winchester.

Flotation sulfur paste is a by-product of the manufacture of coal or artificial gas, and is recovered as a fine sulfur precipitate which, after appropriate filtering and washing, is suitable for use as a fungicide.

Results of his work are reviewed briefly below.

While both fungicides gave excellent control of scab on Starking Delicious apple trees all seasons, trees sprayed with flotation sulfur significantly outyielded those receiving liquid lime-sulfur in the four years that crops were borne in Virginia tests covering five years.

The average annual yield per tree was 5.85 bushels for the flotation sulfur and 4.06 bushels for the lime-sulfur.

Reporting on the results of these experiments in Virginia Agricultural Experiment Station Technical Bulletin 103, Dr. A. B. Groves, plant pathologist, emphasizes the considerable differences in yield. He says, however, that the differences in tree girth at the end of the five years, while favorable to the flotation sulfur, were not statistically significant.

"This was not unexpected as the trees were in a vigorous state of growth throughout the experiment, and the different treatments did not cover the major growth period, but extended only into the earlier part of the growing season after which treatments became uniform," he explains.

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The results of comparisons of a total of 281 pairings of trees growing directly opposite each other "indicated the greater yield from trees receiving flotation sulfur to be highly significant and not due to chance," Dr. Grove concludes.

Growers Long Aware of Possible Injury From Lime-Sulfur

"The grower has long been aware of some of the more obvious injurious effects of liquid lime-sulfur, principally those effects apparent as scorching, burning, and dwarfing of the foliage. He has sought to avoid such injury by the substitution of milder materials, restricting the use of lime-sulfur to a necessary minimum number of applications, and by reducing the strength of the spray solution. These practices have proved helpful, but have not afforded a complete solution."

Dr. Groves adds that experience generally has confirmed the observations that better foliage develops on trees on which the use of lime-sulfur is avoided entirely, and that it is entirely reasonable to expect differences in abundance and condition of foliage to be reflected in differences in tree growth and fruit yield in view of the role of the leaf as the food-manufacturing structure of a plant. This his tests confirmed, particularly with regard to yield.

Differences in Dr. Groves' treatment began with the pre-pink spray and extended through the second cover spray, which conforms with general spray practice.

Heavier Set of Fruit on Trees Sprayed With Flotation Sulfur

"The differences in yield were brought about by a heavier set of fruit on the trees sprayed with the flotation sulfur," he says. "The difference in number of fruits borne was apparently attributable both to differences in numbers of fruit buds formed and to differences in fruit set. Fruit-bud formation was conspicuously heavier in 1943 on the trees sprayed with flotation sulfur. There was no difference in fruit size or finish for the two treatments.

"The reduction in carbon dioxide assimilation resulting from the application of lime-sulfur seems to be the fundamental factor underlying differences in fruit set and bud formation. With varieties and in situations where fruit-bud formation or fruit set is unsatisfactory, better fruiting and yields can be reasonably anticipated where a milder fungicide such as flotation sulfur is utilized instead of liquid lime-sulfur."

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"FERMATE"-SPRAYED VINES PRODUCE 4 TONS OF GRAPES PER ACRE IN BLACK-ROT INFESTED VINEYARD--UNSPRAYED VINES YIELD TON

A vineyard of Concord grapes near Branchport, N. Y., in which the 1945 crop was destroyed by black rot, produced more than four tons of fruit per acre in 1946 from vines sprayed three times with "Fermate" fungicide. Only slightly over one ton of grapes per acre was obtained from unsprayed vines in the same vineyard.

Dr. A. J. Braun, plant pathologist at the New York Agricultural Experiment Station at Geneva, who supervised the tests, says the sprays were applied immediately before bloom, on July 9 after the blossoms had set fruit, and two weeks later.

"At 1946 prices, the increase in yield due to spraying represented a gain of $480 to the acre, from which the cost of the spray material plus the labor for spraying and harvesting the increased yield would have to be deducted," the New York scientist says.

"FERMATE" CONTROLS BLACK ROT OF GRAPES WITHOUT CAUSING SPRAY INJURY

"Fermate" fungicide, containing ferric dimethyl dithiocarbamate, is science's answer to the long search for a chemical that will effectively control black rot of grapes without causing serious injury to the foliage, stems, and fruit.

While Bordeaux mixture controls this disease, it may cause injury to the plants and berries. Knowing this, plant pathologists, some years ago, set about to determine whether some of the newer fungicides might not give adequate control without such costly spray injury.

Tests In Ten Missouri Vineyards Prove Value of Fungicide

Among these scientists was Dr. H. G. Swartwout at the Missouri Agricultural Experiment Station. Under his supervision, tests with a number of different chemicals were conducted in 1944, 1945, and 1946 in 10 different vineyards.

Dr. Swartwout reports that "Fermate" gave excellent control of black rot on stems, leaves, and fruits when applied thoroughly and timely, even under conditions highly favorable for development of the disease.

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"In 1946, as in 1944 and 1945, it gave slightly better control, under conditions of the experiments, than did Bordeaux," he says. "During the three years' work with 'Fermate', there has been no injury or only very slight injury in the 10 vineyards where it was used. The effect of the 'Fermate' has been to produce a slightly darker-green leaf and to cause a slight downward and inward cupping of leaf margins, but the effect is not marked.

"Bordeaux under similar conditions in every instance caused some leaf injury. In the majority of cases, the injury from Bordeaux has been moderate to moderately heavy -- far more than is desirable."

Dr. Swartwout says that, as a practical demonstration, a two-acre vineyard was treated commercially with a spray, made up of two pounds of "Fermate" in 100 gallons of water. "Unsprayed vines showed 38.6 per cent of the fruit affected with black rot, while not one black-rot berry could be found in the remainder of the vineyard which produced a crop of about three tons of grapes. The year before, due to black rot, only about one-half ton of fruit was harvested," he says.

Sprayed Grapes Larger Than Fruit From Unsprayed Vines

The Missouri horticulturist adds that the "Fermate"-sprayed grapes were a little larger than those from unsprayed vines. He continues: "The smaller size of Bordeaux-sprayed grapes as compared with fruit from unsprayed vines and those sprayed with 'Fermate' in 1946 conforms with measurements made in 1945. The reduction in the size of Bordeaux-sprayed grapes has appeared to vary directly with the extent of the injury to the foliage."

Where black-rot control is a problem, 150 gallons of spray per acre in the early sprays to as much as 250 gallons in the later sprays, depending on the amount of foliage, is advisable with "Fermate", according to Dr. Swartwout. He also recommends, when rains are frequent and in seasons of slow development due to cold weather, that "Fermate" be applied every 10 to 12 days, which may necessitate an extra application. With "Fermate," at least 250 pounds and preferably 300 pounds pressure should be used to drive the spray into the vines.

Protection Needed More Before Than After Rain

In the Missouri tests, "Fermate" caused no injury in cold rainy weather. Dr. Swartwout says the spray, applied immediately ahead of a rain or even in a light rain, will afford considerable protection until another application can be made when the spray can dry. Protection against the disease is most needed before and not after a rain. The piling up of "Fermate" from a spray following one a few days earlier has not caused appreciable injury in any of the Missouri tests, he concludes.

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NEW AGRICULTURAL MOVIES ON DDT INSECTICIDES, ANTU RODENTICIDES, AND SEED DISINFECTANTS NOW AVAILABLE FOR SHOWING TO FARM GROUPS

Chemistry's partnership with the farmer is vividly depicted in three new Du Pont agricultural motion pictures that show the "how it is being done" story of DDT insecticides, Antu rodenticides, and seed disinfectants and protectants.

"Report on DDT"--This is an on-the-spot report of how farmers and ranchers all over the country use DDT insecticides to combat horn flies, stable flies, lice, ticks, and many harmful crop pests.

Farmers and ranchers have long waited for an insecticide whose effectiveness would last over a period of time. Now, with DDT as the answer, they are interested in how other farmers use it as a spray or dust on crops, livestock, and buildings, and the results they are getting.

Du Pont movie crews spent a year in the field filming the many and varied uses of DDT, especially to free livestock of insects that reduce weight and that lower the quality of beef and dairy products. They recorded on 16 mm., sound-and-color film the activities of those farmers who follow the latest recommendations on the proper use of DDT on both livestock and fruit and vegetable crops. The picture runs 20 minutes.

"Antu, Modern Pied Piper" -- This 12-minute, 16 mm., black-and white, sound, short subject illustrates rat damage, its cost to farmers, and what to do about it. It shows how farmers can best use Antu rat poisons, and demonstrates with actual farm scenes how to kill the Norway or brown rat easily and economically.

As the story unfolds, the commentator's voice tells a farmer with a rat problem what to do. The farmer is shown carrying out the instructions in an energetic and sometimes amusing but correct way. And then the results are shown. And of course all the precautions needed when rodenticides are used about the farm and home are emphasized.

"Lost Harvest" -- This film dramatizes the need for controlling certain seed-borne and soil-borne diseases that cause heavy damage to crops every year.

Ed White, a farmer, discovers smut in a field of wheat he is about to harvest. He discusses his problem with County Agent Tom Burke, who tells him of the laboratory work and testing back of seed disinfectants. The county agent takes Mr. White to a neighbor's farm where they see a mechanical seed-treating machine in action. The farmer also sees the results of proper seed disinfecting, and is convinced.

This 20-minute, color-and-sound film contains an important message for every American farmer, regardless of the crops he grows. It has many touches

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of human interest, such as the comments of Mr. White's wife. Her garden, full of high-quality vegetables, causes her husband to ask some questions. He is duly impressed to learn that Mrs. White plants only seeds that are chemically treated with the right amount of the proper disinfectant and protectant.

Other Agricultural Films Available for Farm Meetings

Du Pont has other films on agricultural subjects that are shown to farm audiences all over the country. They deal with subjects that are still of great interest to large numbers of farm people, as follows:

"The Story of Phenothiazine" -- This two-reel, color-and-sound picture shows the use of phenothiazine to remove intestinal worms from livestock. Produced in cooperation with the U. S. Department of Agriculture, the picture opens with scenes from Beltsville, Md., where research on phenothiazine was started. The film traces developments in the use of this drug on Texas ranches and on farms in Missouri, Kansas, and Ohio; and brings to the screen the authentic methods employed in administering it to sheep, cattle, hogs, horses, and other animals. Running time is 22 minutes.

"A Better Way" -- This 16 mm., color-and-sound picture presents the discovery and development of "Delsterol" "D"-activated animal sterol, the source of vitamin D_3, which has done much to aid poultrymen increase egg production and to raise healthier chickens. It shows how "Delsterol" is tested on living chicks to make sure in advance that it has the desired potency. An agricultural college lecturer, talking to a class on the need for balanced feeds, cites the experience of two graduates in solving the problem of shortages in vital ingredients. He then shows a "film within a film" to portray the basic facts about "Delsterol." Running time is 22 minutes.

"Guardians of Plenty" -- This 26-minute, color-and-sound film shows how pest-control research helps protect America's food supply. Of special interest is microphotography of various insects -- a codling moth emerging from its cocoon, an aphid bearing living young, a lethal chamber for flies, and many other unusual research scenes.

NOTE: Requests for films listed above should be sent to the Editor, Du Pont "Agricultural News Letter," Wilmington 98, Del., as far in advance as possible to insure bookings. Include name of organization, address, title of film, date of showing, and alternate dates.

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U. S. ENTOMOLOGISTS RECOMMEND SPRAYING CATTLE WITH DDT TO CONTROL AFRICAN CATTLE LOUSE, RECENTLY DISCOVERED IN FLORIDA AND TEXAS

Government entomologists recommend using DDT to control the African cattle louse.

For years this pest was known to occur only in the vicinity of the Cameroons, West Africa, and was kept from coming to the United States by careful quarantine inspection at sea and air ports of entry. But two years ago it was discovered in Florida and lately in Texas. The entomologists call the spread of this foreign invader "a very serious problem." Heavy infestations of the louse rapidly sap the cattle of their vitality, causing some to become too feeble to walk.

The federal scientists suggest using sprays containing 1.5 per cent (not less) of DDT in wettable powder form, which they have found gives good control. They recommend covering the entire animal with 1½ pints of this spray.

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NEOPRENE-COVERED WIRE BASKETS FOR HARVESTING, HANDLING FARM PRODUCTS

Wire baskets used for harvesting and handling potatoes, fruit, eggs, and other farm products are now being covered with strong, durable, protective neoprene synthetic rubber.

The soft, resilient coating made of neoprene that covers the hard, slender steel rods helps reduce bruising of the perishables placed in the containers. It withstands the harmful action of sunlight, heat, and abrasion. The longlasting rubber made by Du Pont is the major constituent of the protective coating that withstands oils, greases, fats, and any chemicals that touch or cover it. It also prevents corrosion and rusting of the metal.

Neoprene-coated baskets are handy for such farm chores as dipping seed potatoes in a solution of "Semesan Bel" seed disinfectant. This contains powerful germ-killing chemicals known to scientists as hydroxy-mercuri-nitrophenol and hydroxy-mercuri-chlorophenol. This fungicide is widely used to reduce seed decay and seed-borne Rhizoctonia and scab of Irish potatoes and stem-rot, black-rot, and soil-stain or rust of sweet potatoes.

Because of the open construction, much of the dirt, leaves, and other debris that ordinarily accumulates in other types of baskets falls through the wire containers.

NOTE: Names of manufacturers who are applying or are capable of applying this type of coating will be sent on request. Address the Editor, Du Pont "Agricultural News Letter," Wilmington 98, Del.

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